


CHIMERE Training Course

Run CHIMERE and visualize results

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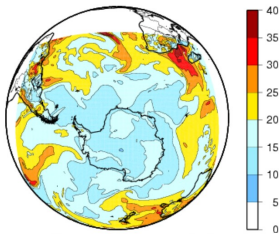
A multi-scale chemistry-transport model for atmospheric composition analysis and forecast

News:

- ♦ [2016/09] 12th CHIMERE Training Course: September, 14-16, 2016
- ♦ [2016/07] **Release of the 2016a version**
- ♦ [2016/06] Update of the 'articles' page
- ♦ [2016/04] Article about the on-line development submitted to GMDD
- ♦ [2016/02] New CHIMERE logo

Short model description

The CHIMERE multi-scale model is primarily designed to produce **daily forecasts of ozone, aerosols and other pollutants** and make **long-term simulations** (entire seasons or years) for emission control scenarios. CHIMERE runs over a range of spatial scale from the regional scale (several thousand kilometers) to the urban scale (100-200 Km) with resolutions from 1-2 Km to 100 Km. On this server, documentation and source codes are proposed for the complete multi-scale model. CHIMERE proposes many different options for simulations which make it also a powerful research tool for testing parameterizations, hypotheses. CHIMERE is a **parallel model** that has been tested on machines ranging from desktop PCs running the GNU/Linux operating system, to massively parallel supercomputers (HPCD at ECMWF).



Ozone surface concentrations using the hemispheric domain

What's new in the chimere2016a release?

Processes

- The mesh generation and management was changed and you can now run the model on hemispheric domains. These domains may be manually defined or directly those of WRF (if using this meteo model).
- All required forcings databases are now global and with high spatial resolution. This includes databases for mineral dust emissions, now calculated over any domain and the possible use of the [Kok, 2014] production model
- Many processes are better estimated during the simulation:
 - The CFL was optimized and the model runs faster
 - The aerosol growth now depends on humidity
 - The boundary conditions are more realistic in case of nesting
 - A new resuspension scheme (for urbanized areas) was added
 - The SAPRC-07A chemical scheme was added, including chlorine chemistry
 - The LAI is now read in time-dependent databases

The model code: sources, documentation, publications

- The [CHIMERE Documentation](#)
- How to [download the model source code](#)
- To learn how to use and modify the model, [training sessions](#) are organized twice a year
- The [Frequently Asked Questions](#) page
- A detailed list of [updates and bugs](#) found in the previous version
- List of useful [scripts](#) for pre or post-processing
- List of [publications](#) using CHIMERE
- A wysiwyg Linux tool to easy plot the results of a simulation: [CHIMPLOT](#)

Contacts

- [Who and where for the development](#) (developers and main contributors)

Install CHIMERE: download and configure

1. Use the script **chimere-download.sh** to download CHIMERE code and data:

```
$ chmod +x chimere-download.sh
```

```
$ ./chimere-download.sh <login> <password>
```

→ You need to specify the BIGFILES root directory where to download the data (land use, etc.)

2. Configure your **mychimere.sh**: create a version for your system, libraries, and Fortran compiler

- *At this time a Fortran compiler, a corresponding NetCDF library, and MPI need to be installed on your computer*
- *The NetCDF and MPI libraries must be compiled with the same compiler as CHIMERE*
- *You need to use netcdf4/hdf5 because of large input files (e.g land use datasets) used in CHIMERE*

```
$ ./config.sh mychimere.sh.gfortran
```

Attention ! If using **gfortran**, make sure you are using version **4.7.2** or later !

Q: Take a look at *mychimere.sh*. What kind of file is it ? A regular file?

Compile and run Chimere:

- `./chimere.sh c`
- `edit chimere.par`
- `chimere.sh [<date>]`

If you have errors running CHIMERE, it is often necessary to 'make clean' and remove the **chemprep/inputdata...** directory

Tasks

1. Run CHIMERE for the March 2009 winter-time PM pollution event test case.

- Modify chimere.par : \$bigfilesdir, \$nhours, \$simuldir, \$meteo_file
- Run chimere.sh for 9 days (216 hours) from March 7, 2009

➤ nedit chimere.par &

1) bigfilesdir= path to your BIGFILES directory given when running *chimere-download.sh*

2) nhours=216

3) Possibly some data directories: datadir, metdir, aemisdir, iniboundir, so that CHIMERE knows where to take data from a previous run (if, e.g., imakebound=2)

4) if you do not have a write permission to BIGFILES dir: simuldir=`pwd`/OUTPUTS

5) If you comment out meteo_file, *interf-WRF* will try to find the WRF file with appropriate date in the meteo_DIR directory.

➤ ./chimere.sh 20090307 216

➤ or just ./chimere.sh if you prefer to use the values di and nhours specified in chimere.par

Tasks (continued)

2. Use CHIMPLOT to interactively plot slices of data

- Download CHIMPLOT at <http://www.lmd.polytechnique.fr/chimplot/>
- Make sure the Scientific Python is in your PATH:

```
$> which python
```

```
<something>/epd-7.0-2-rh5-x86/bin/python
```

If you get /usr/bin/python => the standard python is being used by default. So you need to add scientific python's libraries in your path, as well as CHIMPLOT.

```
$ source set_paths.sh
```

```
$ ./chimplot.py [file_name.nc]
```

3. Analyze the simulation

When the simulation is ready, explore the model outputs using Chimplot. A few questions to consider:

- Are the simulated fields in agreement with the figures shown in the Documentation (section 2.7)?
- What is the meteorological situation during the pollution event?
- Did emission changes contribute to the simulated peaks?
- See if during the simulation period, model concentrations reached or exceeded alert or information threshold levels for O3, NO2, PM10, PM25, SO2, CO:

<http://www.airparif.asso.fr/reglementation/normes-europeennes>

Tip: You can use CHIMPLOT's “Locate Max” function (in the main menu).
